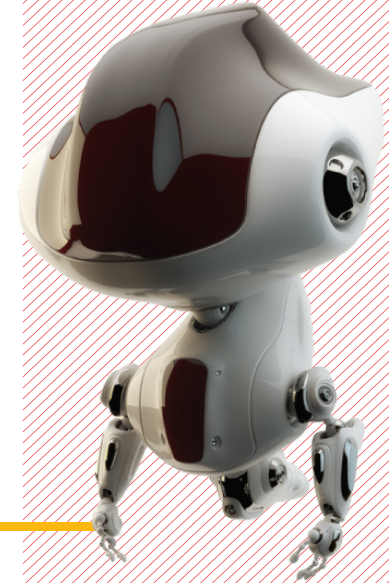


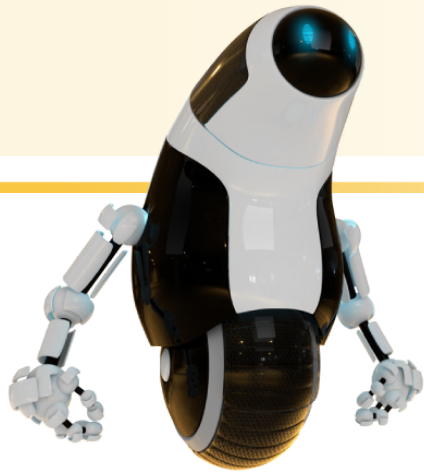


# Temperature Monitoring System

## Enhancement Controls

---





Background

Project

Experiments & Results

Future Work

Conclusion

# Background

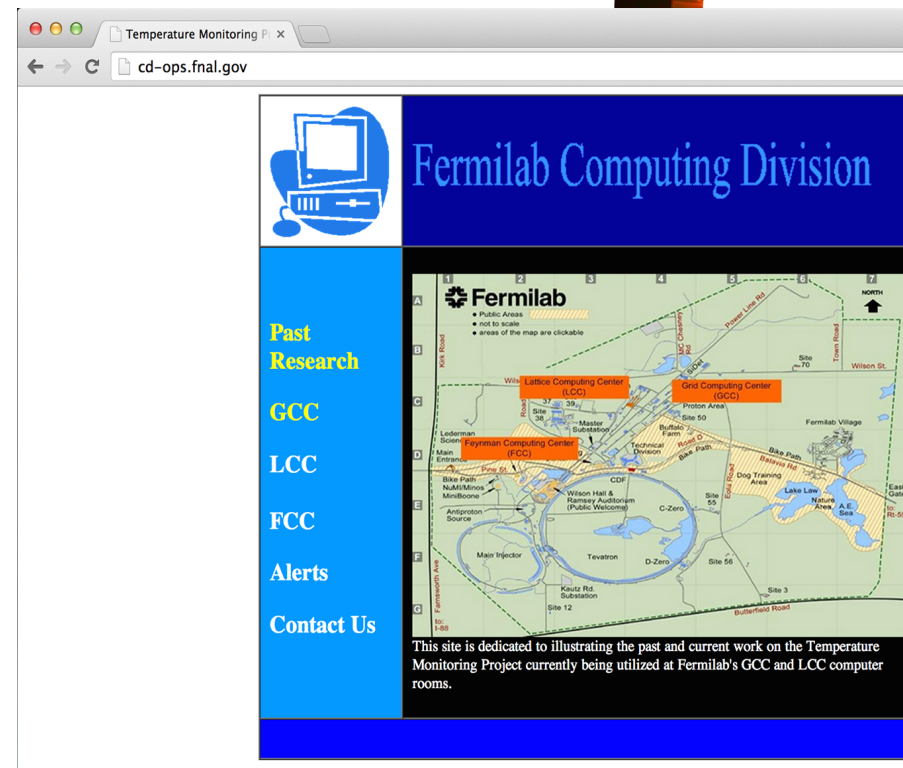
## Temperature Monitoring System

Visual monitoring of temperatures

Alerting of anomalies

Daily representation of temperature per room

Daily storing of data collected by sensors



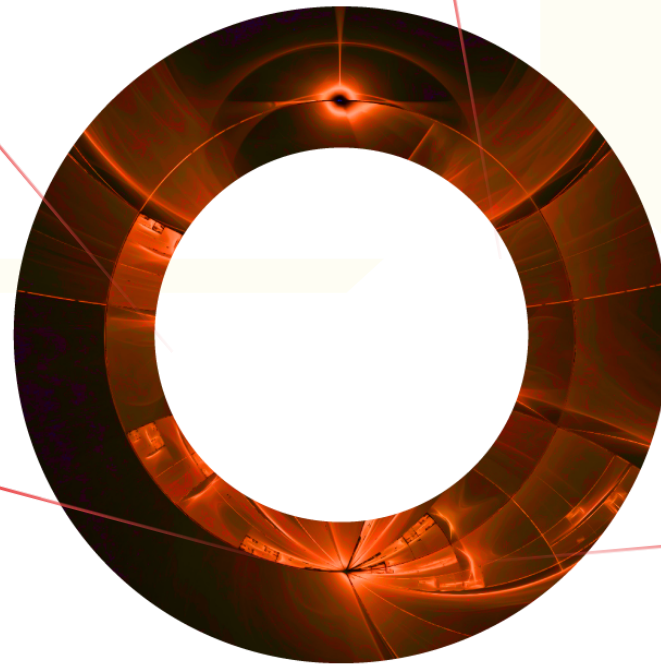
# Project

Temperature Threshold  
Editing Control

Excel Data Converter

Git Repository

Google Chart  
Graphing Technology





# Threshold Editing Control

```
<filename>mapGCC-CRA.jpg</filename>
<cropX1>133</cropX1>
<cropY1>30</cropY1>
<cropX2>611</cropX2>
<cropY2>575</cropY2>
<sizeX>600</sizeX>
<sizeY>600</sizeY>
<originmapX>185</originmapX>
<originmapY>80</originmapY>
<endmapX>556</endmapX>
<endmapY>492</endmapY>
<originbuildingX>0</originbuildingX>
<originbuildingY>0</originbuildingY>
<endbuildingX>36</endbuildingX>
<endbuildingY>40</endbuildingY>
</floormap>
- <thresholds>
  <threshold type="cold" bound="low">55</threshold>
  <threshold type="cold" bound="high">95</threshold>
  <threshold type="hot" bound="low">50</threshold>
  <threshold type="hot" bound="high">130</threshold>
</thresholds>
<buildpath>D:\inetpub\wwwroot\GCC\CRA</buildpath>
</room>
</rooms>
- <email>
  <smtpserver username="" password="" auth="0">smtp.fnal.gov</smtpserver>
  <sender>CD-GCC-ENVIRONMENTAL-ADMIN@listserv.fnal.gov</sender>
  <recipient>DEV-TEMP-MONITORING@fnal.gov</recipient>
  <subjectprefix>GCC TEMPERATURE MONITOR</subjectprefix>
</email>
<fontname>lubBI10.pil</fontname>
</data>
```

Before:

File is hidden amongst other data files

Not user-friendly

After:

- Program resides at desktop

User-friendly layout

**Edit Threshold**

GCC-CRA

☒ Hot ☐ Cold

Low Threshold: 50 - +

High Threshold: 130 - +

Clear Submit

Accidental deletion/change poses potential source of error

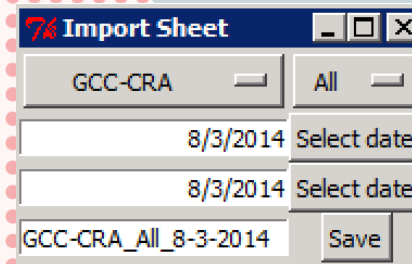
# Excel Data Converter

Intuitive design

Possibility to select All/Hot/Cold aisle sensors

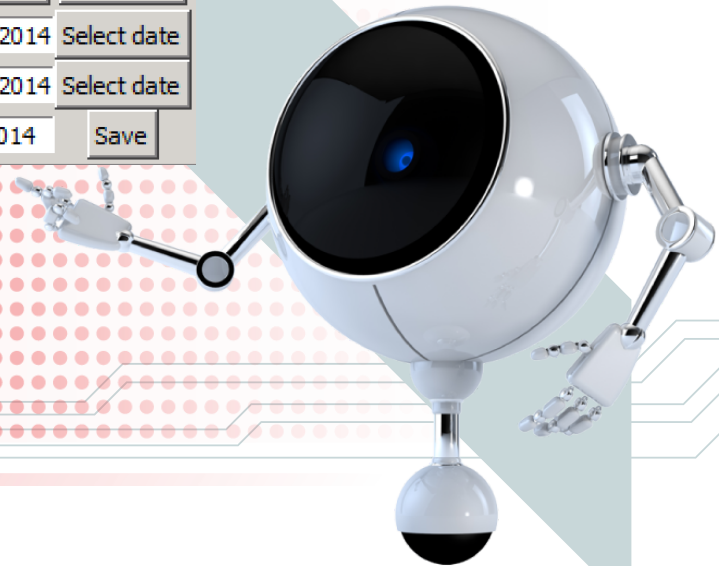
Selectable range of dates to obtain data

Default saving name or given by the user

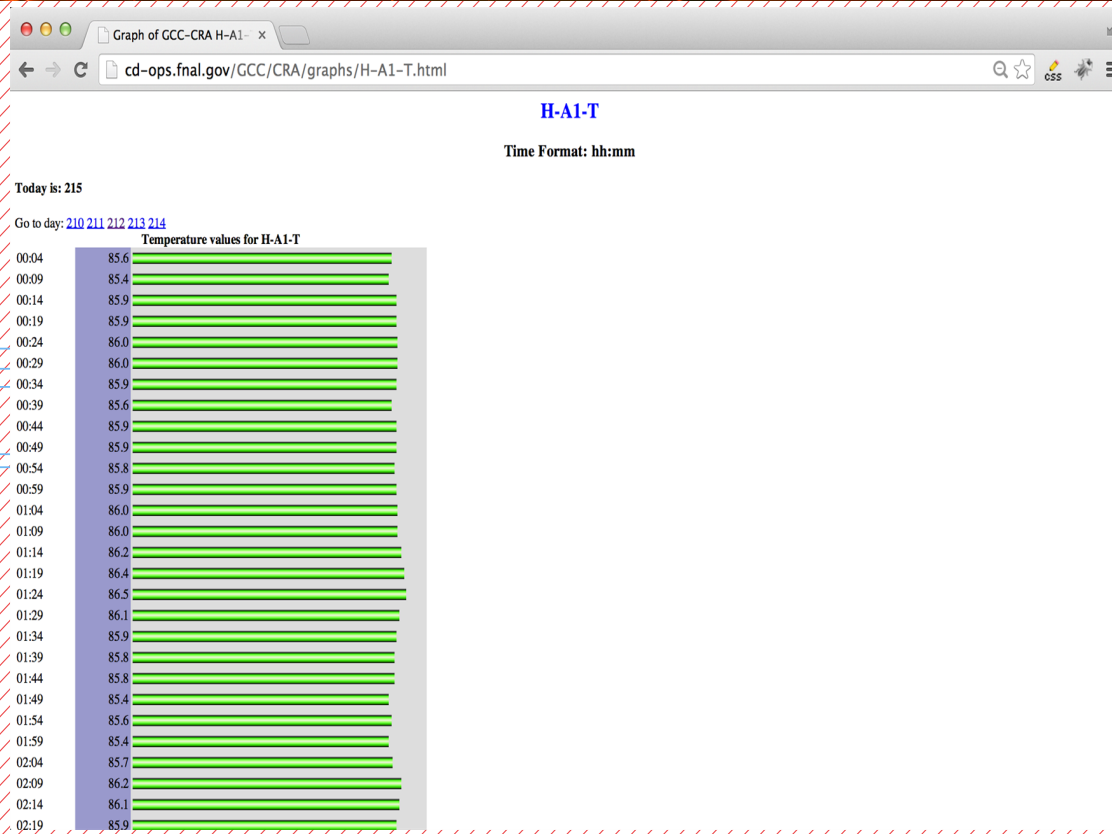


The screenshot shows a dialog box titled "Import Sheet" with a red 7% logo. It contains several input fields and buttons. The first row has a dropdown menu showing "GCC-CRA" and a button labeled "All". The second row has a date field showing "8/3/2014" and a button labeled "Select date". The third row has another date field showing "8/3/2014" and a button labeled "Select date". The fourth row has a text field showing "GCC-CRA\_All\_8-3-2014" and a button labeled "Save".

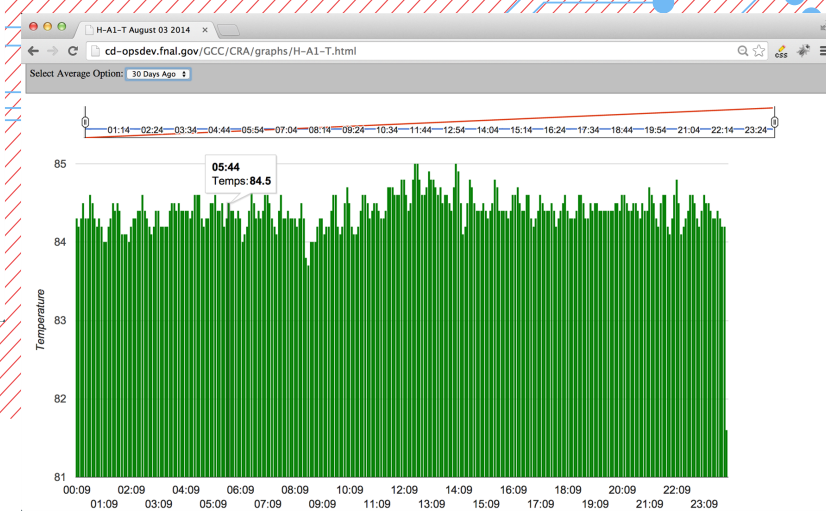
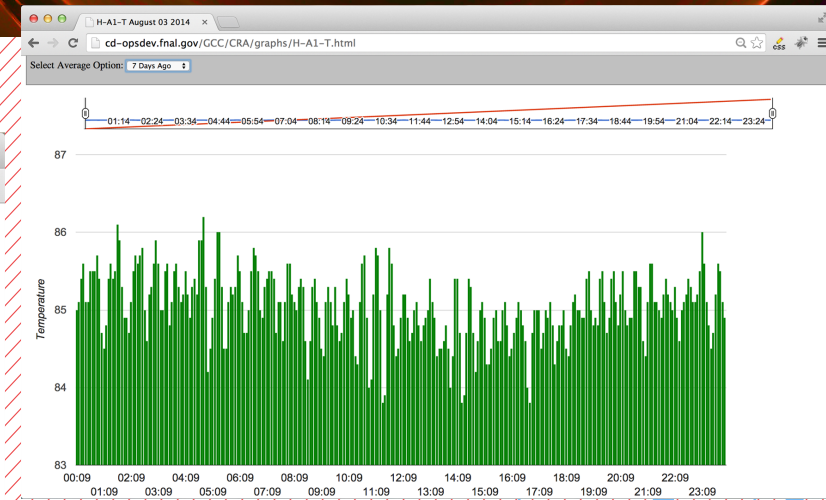
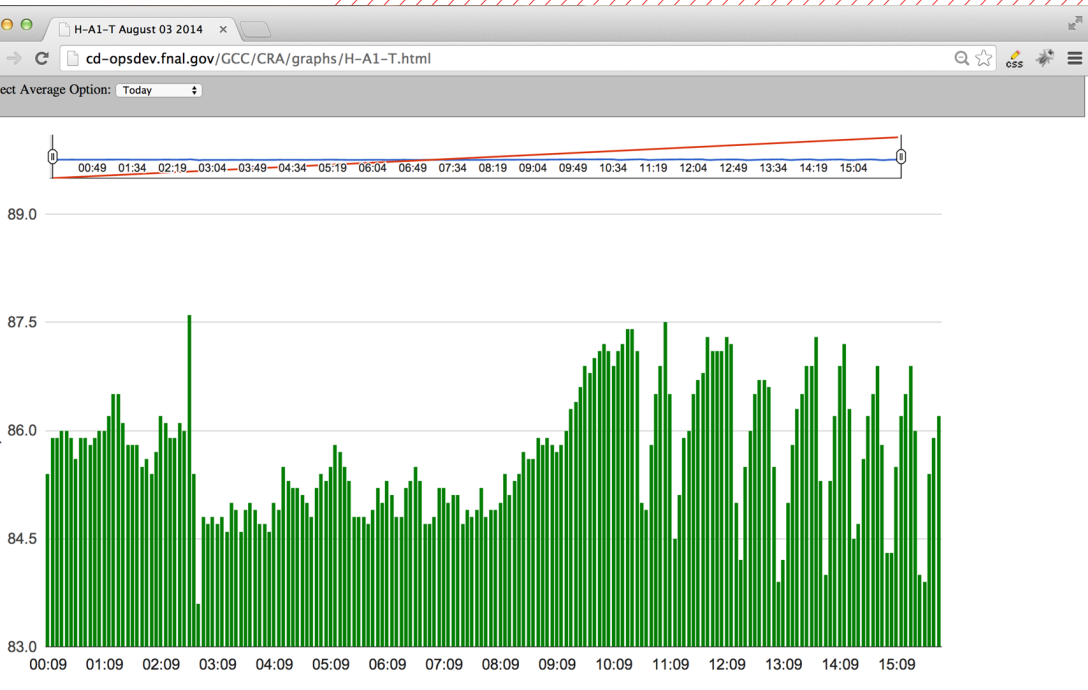
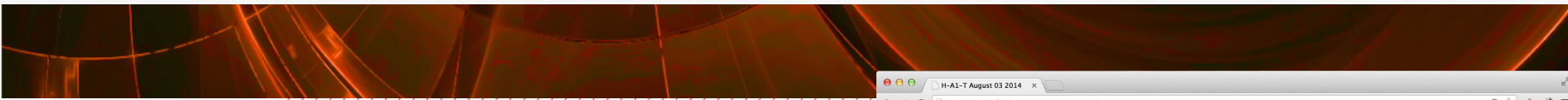
7% Import Sheet	
GCC-CRA	All
8/3/2014	Select date
8/3/2014	Select date
GCC-CRA_All_8-3-2014	Save



# Graphing Technology I



## Old System's Graphs



The future is already here!

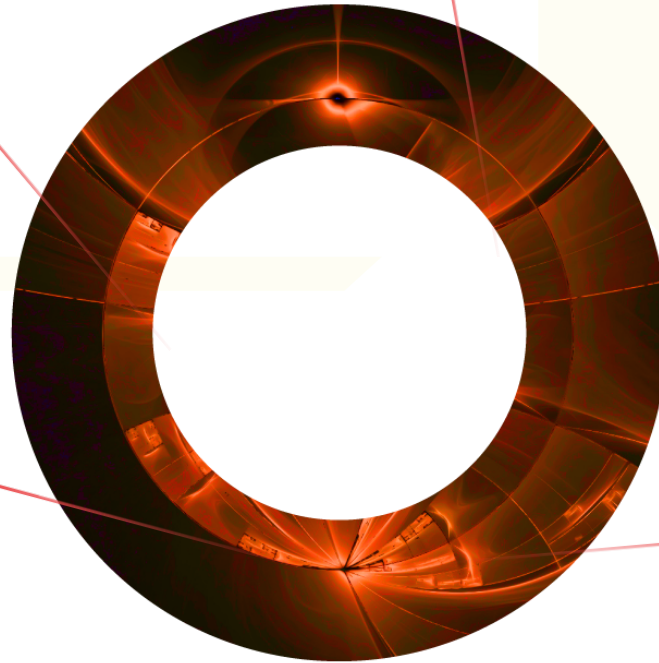
# Experiments & Results

Temperature Threshold  
Editing Control

Excel Data Converter

Git Repository

Google Chart  
Graphing Technology



# Threshold Editor

## Tests Performed:

- Opening of Right Configuration File

Display of Correct Threshold

Input Check

## Results Obtained:

Configuration File Modification

Configuration File Corresponded to the Room

Threshold Displayed Belonged to Aisle Picked

Incorrect Characters, High Less Than Low

Prompted Warnings





**CD-GCC-ENVIRONALERT-ADMIN@listserv.fnal.gov**

4 de agosto de 2014 09:40 AM

Para: arivero@fnal.gov

Temperature Monitoring System Notification GCC-CRA

!!!!!!!!!!!!!!THRESHOLD CHANGE AT GCC-CRA IN COLD AISLE!!!!!!!!!!!!!!

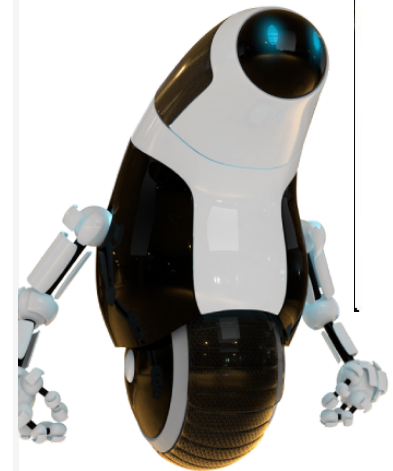
Time of Modification = 09:40

Original Threshold: 95

New Threshold: 100

Please refer to the site below to review the temperatures recorded.

<http://cd-ops.fnal.gov/GCC/CRA/index.html>





# Excel Data Extractor

## Tests Performed:

Room and Sensor Selection

Date Validity

Functionality of "Save button"

## Results Obtained:

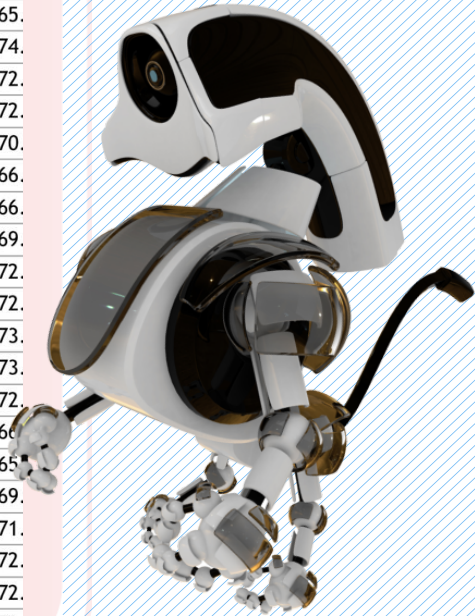
Displayed Sensors for Room Selected

Incorrect Dates Prompted Warnings

New File Saved in Default Location



A	B	C	D	E	F	G	H	I	J	K	L	M	
Date	CA1M	CA1T	CA6M	CA6T	CB1M	CB1T	CB6M	CB6T	CC1M	CC1T	CC11M	CC11T	CC
7/10/2014 00:04	72.1	73.5	66.7	66.2	75.1	74.1	67.4	67.3	69.1	69.6	65.2	66.2	71.
7/10/2014 00:09	72.4	73.8	66.7	66.2	75.5	74.5	67.4	67.3	68.8	69.2	65.0	66.4	72.
7/10/2014 00:14	72.4	73.9	66.7	66.2	75.7	74.6	67.3	67.2	68.5	68.8	65.1	66.3	72.
7/10/2014 00:19	74.2	75.2	71.5	71.7	76.5	75.7	71.4	71.7	72.9	72.1	64.9	65.9	72.
7/10/2014 00:24	68.2	69.9	67.4	67.2	68.5	69.1	67.0	67.5	69.7	69.9	63.9	64.6	67.
7/10/2014 00:29	66.5	67.9	66.2	66.1	66.2	67.0	66.1	66.5	68.8	69.1	63.9	64.8	65.
7/10/2014 00:34	73.8	74.4	72.7	73.1	74.6	74.3	73.3	73.3	72.9	73.1	72.1	72.5	74.
7/10/2014 00:39	72.5	73.9	67.8	67.2	75.9	75.0	68.4	68.2	69.4	69.6	66.9	67.8	72.
7/10/2014 00:44	72.3	74.1	67.3	66.7	76.4	75.2	68.2	67.8	68.9	69.2	66.5	67.2	72.
7/10/2014 00:49	70.7	72.7	66.5	66.0	73.1	72.9	66.8	66.9	68.5	68.8	65.3	66.1	70.
7/10/2014 00:54	68.1	69.4	69.6	70.2	67.3	68.3	68.9	69.6	72.0	71.4	63.9	64.5	66.
7/10/2014 00:59	68.0	69.2	72.7	73.8	66.5	67.9	71.9	72.9	74.6	73.9	66.5	67.3	66.
7/10/2014 01:04	67.0	68.2	68.3	68.5	65.9	67.0	68.6	69.0	70.8	71.1	72.0	72.5	69.
7/10/2014 01:09	71.8	72.8	68.3	67.8	74.0	73.3	68.7	68.7	69.9	70.1	67.2	67.9	72.
7/10/2014 01:14	72.4	73.6	68.1	67.6	75.3	74.4	68.5	68.4	69.7	69.8	66.2	67.2	72.
7/10/2014 01:19	72.3	73.8	68.2	67.6	75.7	74.8	69.1	68.7	69.4	69.5	66.0	66.9	73.
7/10/2014 01:24	72.8	74.2	68.0	67.4	76.2	75.1	68.4	68.3	69.2	69.3	66.0	66.7	73.
7/10/2014 01:29	71.9	73.7	67.7	67.3	74.8	74.3	67.9	67.9	69.1	69.3	65.2	66.2	72.
7/10/2014 01:34	67.1	68.7	66.5	66.5	67.2	67.8	66.3	66.8	68.8	68.9	64.0	64.8	66.
7/10/2014 01:39	67.7	69.0	71.8	72.9	66.5	67.7	71.3	72.3	72.9	72.6	64.3	65.4	65.
7/10/2014 01:44	71.0	71.9	68.5	68.1	72.0	71.8	68.5	68.7	70.3	70.6	65.2	66.2	69.
7/10/2014 01:49	72.6	73.8	68.1	67.6	75.0	74.3	68.4	68.4	70.0	70.3	65.2	66.0	71.
7/10/2014 01:54	73.0	74.4	68.1	67.4	76.0	74.9	68.3	68.3	69.6	69.9	64.9	66.0	72.
7/10/2014 01:59	73.5	74.7	67.7	67.0	76.6	75.6	67.9	67.9	69.2	69.4	64.4	65.5	72.
7/10/2014 02:04	72.9	74.5	67.7	67.2	76.7	75.6	68.3	68.1	69.2	69.3	64.9	66.0	72.
7/10/2014 02:09	68.2	69.9	66.9	66.7	68.8	69.3	66.7	67.1	68.8	68.9	64.3	64.8	67.

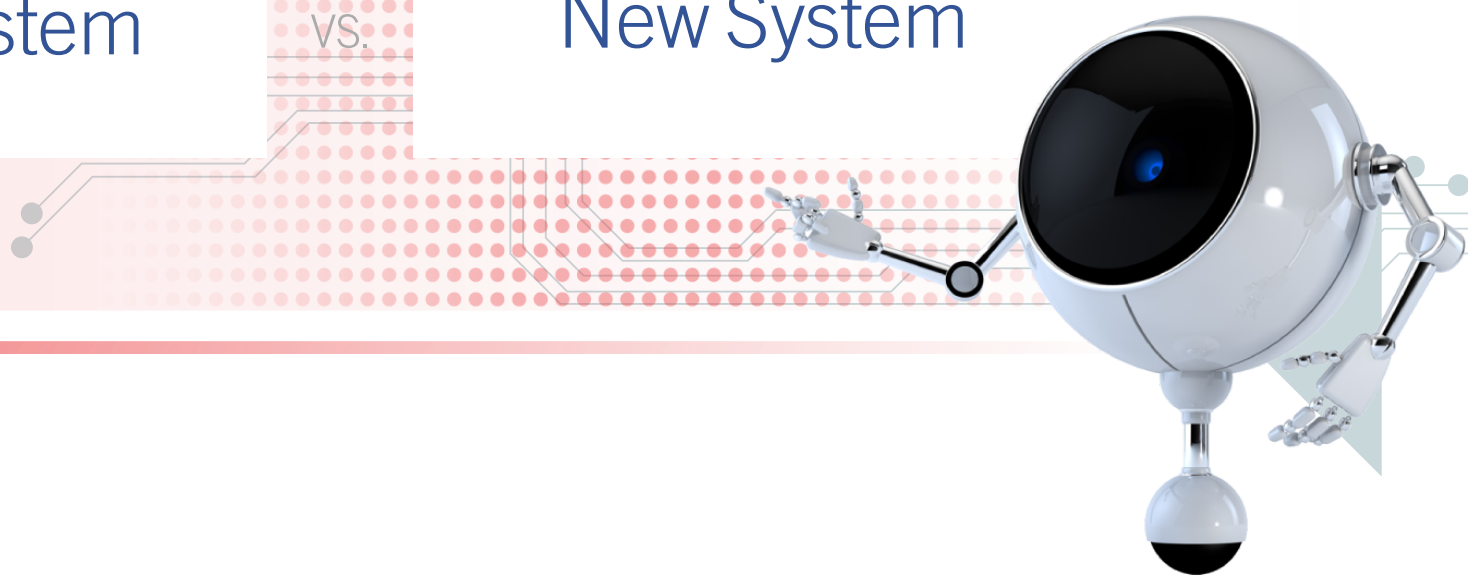


# Graphing Technology

Old System

vs.

New System



# Future Work

- Migration to Linux
- Database
- Web framework

**Next Summer Project**



# Conclusion



- Source Code Backed-up in GIT Repository
- Temperature Threshold Control in Production
- Excel Data Converter under Revision and Testing
- Google Charts Graphs under Revision



Successful Enhancement of Existing Monitoring System



